

[Patent claims]

1. Magnetic nanoparticles comprising metal oxides and a polymer, characterized in that they
  - a) contain 50 or more mass percent of metal;
  - b) have hydrodynamic diameters of less than 200 nm;
  - c) have higher magnetization at low magnetic field strengths than the metal oxide used;  
and,
  - d) are produced using high pressure homogenization.
2. Magnetic nanoparticles in accordance with claim 1, characterized in that in water and aqueous solutions they form a colloid that is stable for a long period without the effect of an external magnetic field.
3. Magnetic nanoparticles in accordance with claims 1 and 2, characterized in that they can be separated with permanent magnets.
4. Magnetic nanoparticles in accordance with claims 1 through 3, characterized in that said metal oxides are iron oxides, such as magnetite or maghemite, or corresponding mixed phases.
5. Magnetic nanoparticles in accordance with claims 1 through 4, characterized in that said iron oxides possess portions of other bivalent or trivalent metal ions.
6. Magnetic nanoparticles in accordance with claims 1 through 5, characterized in that said polymer is a synthetic polymer.
7. Magnetic nanoparticle in accordance with claims 1 through 5, characterized in that said polymer is a natural or derivatized polysaccharide.

8. Magnetic nanoparticles in accordance with claims 1 through 7, characterized in that said polysaccharide is dextrane.
9. Magnetic nanoparticles in accordance with claims 1 through 8, characterized in that said dextrane is derivatized with functional groups or substructures.
10. Method for producing magnetic nanoparticles in accordance with claims 1 through 9, characterized in that said polymer and metal oxide components are ultrahomogenized in a carrier medium at pressure of 500 bar or greater.
11. Method for producing magnetic nanoparticles in accordance with claim 10, characterized in that water is used for said carrier medium.
12. Method for producing magnetic nanoparticles in accordance with claims 1 through 9, characterized in that said metal oxide component is produced in situ from corresponding metal salts or hydroxides.
13. Method for producing magnetic nanoparticles in accordance with claim 12, characterized in that said carrier medium is alkaline.
14. Method for producing magnetic nanoparticles in accordance with claims 12 and 13, characterized in that said carrier medium is a solution of ammonia in water.